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ABSTRACT

This project report explains the goals of the Academic Advancement Program, briefly describes the background events leading to the development of the program, outlines its essential elements, summarizes its contents, and details the cost and procedure for replication in other school districts. (Author/DT)

ACADEMIC ADVANCEMENT PROGRAM PROJECT REPORT

Commissioner's endorsement

On behalf of the Department of Education, State of New Jersey, I wish to bring the Academic Advancement Program to the attention of educators throughout the nation. By providing individualized, self-paced instruction within heterogeneous classrooms, the program has made a significant contribution to the education of students, especially those in racially integrated schools. It thus has addressed a great national need.

Fred G. Burke

Fred G. Burke
Commissioner of Education
State of New Jersey

MORRIS SCHOOL DISTRICT, MORRISTOWN, NEW JERSEY 07960

PREFACE

The development and evaluation of the Academic Advancement Program was a cooperative effort of the Morris School District and the Division of Research, Planning and Evaluation, New Jersey Department of Education.

The mathematics section of the program was validated in 1974 by the standards and guidelines of the U.S. Office of Education as successful, cost effective and exportable and approved for dissemination. The language arts section, continuing in its development for another year, was validated in 1975. The program is the recipient of the *Educational Pacesetter Award* from the National Council on Supplementary Centers and Services and the *Excellence in Education Award* from the National Association of State Advisory Council Chairmen. The mathematics section of the program was one of twenty-six programs in the nation selected for inclusion in the publication *Math Programs that Work: A National Survey.*

The Morris School District has been funded as a demonstration site where interested educators may visit the program in operation, secure training and consultation services, and purchase curriculum materials at cost. The services of the project staff are free of charge. The development and dissemination of the Academic Advancement Program are funded through Title III-IV(C) of the Elementary and Secondary Education Act.

INTRODUCTION

The Academic Advancement Program is an individualized instructional program in language arts and mathematics for grades six through eight; it can be used for remediation in the secondary school. Designed as an alternative to ability grouping, it seeks to find a solution to a serious problem that arises when a school district, using homogeneous classes, discovers that it is outwardly desegregated but the classrooms are models of minority group isolation. The rationale behind the Academic Advancement Program is that the practice of ability grouping, especially in a community of cultural and racial diversity, discourages social integration, burdens children assigned to some groups with resentment and humiliation, and reinforces in these children unfavorable self concepts.

Developed and field tested over a three year period from 1972 to 1975, the program involved teachers, teacher aides and administrative staff in planning the curriculum, assembling the basic units, training the teachers and teacher aides, teaching and testing students, and evaluating the results. Total ESEA Title III funding over the three year period was $153,089.

The goal of the Academic Advancement Program was to demonstrate that instruction in mathematics and language arts basic skills is not adversely affected when classroom units are changed from homogeneous group instruction to individualized instruction in heterogeneous units. The project proved that students can achieve progress in skill development at the same growth rate as those taught in homogeneous grouping by skill level. Its dissemination is based upon the success for students in an integrated environment and its exportability.

This project report describes briefly the background events leading to the development of the program, outlines its essential elements, summarizes its contents, and details the cost and procedure for replication in other school districts.

THE DEVELOPMENT PROCESS

In the Summer of 1971 the New Jersey Commissioner of Education, authorized by the New Jersey Supreme Court, ordered the K-12 merger of the Morristown and Morris Township school districts for purposes of racial integration, to take effect on July 1, 1972. At the time of the court order the two communities shared Morristown High School but Morris Township had a pending referendum for the construction of its own high school. Morristown officials felt that the withdrawal of Morris Township students from the high school would create extreme hardship on the Morristown School District. The two communities, although geographically one (Morris Township completely encircles Morristown), were quite dissimilar: the minority population was only 4% in the Morris Township Schools but as high as 47% in the Morristown School. Morristown is the commercial center of the surrounding region with an area of 2.9 square miles and a population density of 5,900 people per square mile. Morris Township, predominantly residential, has an area of 15.8 square miles and a population density of 1,237 people per square mile. The average family income at the time was slightly less than $12,000 in Morristown but slightly more than $18,000 in Morris Township.

The Problem and Need: The Iowa Tests of Basic Skills, administered in the late Fall of 1971 to both school districts (grades 3-8) revealed that many more Morristown students were below grade level than Morris Township students. Thus, the complete merger of the two school districts would provoke serious educational and social problems since the practice of homogeneous grouping in the Morris Township schools would automatically segregate many of the Morristown students, including most of the minority students who ranked in the lower skill levels. On the other hand, heterogeneous grouping of the students would place a severe, if not impossible, burden on teachers

who would have children of many different skill levels in one classroom when they had neither a method nor a system of instruction to cope with the situation.

Educators recognize two major problems facing American education: 1) meeting the needs of individual students; and 2) achieving social integration. Grouping by skill level, adopted as the best means to serve the first ideal, has worked against the second ideal in a racially diverse community. The Academic Advancement Program's task was to demonstrate that a managed system of individualized instruction could effectively serve both ideals and that learning would not be adversely affected when classroom units were changed from homogeneous group instruction to individualized instruction in heterogeneous groups.

WHAT IS THE ACADEMIC ADVANCEMENT PROGRAM?

The Academic Advancement Program is a program of individualized, self paced instruction in language arts and mathematics used in grades six through eight and as a remedial program in the high school. The program follows the precepts of mastery learning. Both the mathematics and language arts portions of the program are based on a sequential hierarchy of basic skills to accomodate a wide range of skill levels. The learning materials, commercially produced, have been reassembled into skill sequences adapted to meet the needs of heterogeneously grouped students. Students can move from one set of materials to another on one skill level or upward as mastery is displayed. Within an AAP classroom it is possible to find twenty or more students all working at different levels.

ESSENTIAL ELEMENTS OF THE ACADEMIC ADVANCEMENT PROGRAM

The essential elements of the AAP are divided into two categories based upon their concern to either the classroom teacher or the administrator. They may be summarized in the following chart:

CLASSROOM TEACHER	ADMINISTRATOR
1. Learning materials used	1. Staff selection
2. Instructional system	2. Supervision and staff support
3. Monitoring system	3. Evaluation
4. Storage system for materials	4. Expansion and refinement in the district
5. Classroom organization system	
6. Use of paraprofessionals	

CLASSROOM TEACHER

I. LEARNING MATERIALS USED

A. *Mathematics:* The commercially produced materials used in the mathematics portion of the AAP are:

1. *Individualizing Mathematics,* Foley, Bower, Basten, and Jacobs, Addison-Wesley Publishing Company, Menlo Park, California, 1970
2. *Essentials of Mathematics,* Sobel, Maletsky and Hill, Ginn and Company, Boston, Massachusetts, 1970
3. *Algebra: A Modern Approach,* Keedy and Bittinger, Addison-Wesley Publishing Company, Menlo Park, California, 1973
4. *Spectrum Mathematics,* France and Clarke, Laidlaw Brothers, River Forest, Illinois, 1973

B. *Language Arts:* The commercially produced materials used in the language arts portion of the AAP are:

Be A Better Reader Series, Nila Banton Smith, Prentice-Hall, Inc., Englewood Cliffs, N.J.

II. INSTRUCTIONAL SYSTEM

A. *Mathematics:* The mathematics learning material is sequenced into sixty-six units each containing precise instructional objectives with test items for each objective. Topics range from operations with whole numbers through roots, radicals and quadratic equations.

Unit

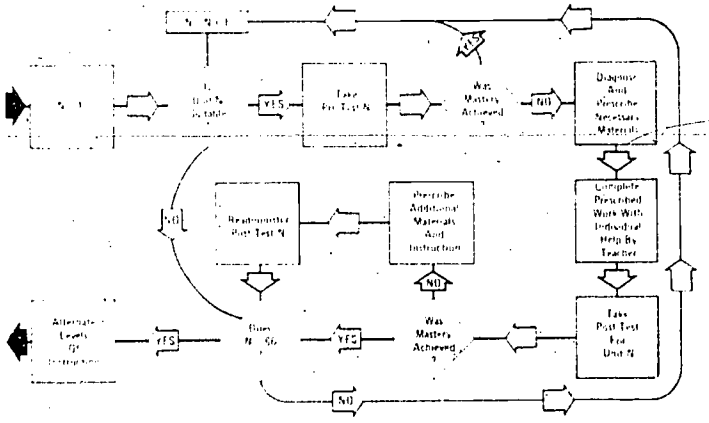
1. Whole Numbers, Operations and Relations
2. Basic Flow Charts
3. Sets, Members and Subsets
4. Factors and Multiples
5. Fractions-Addition and Subtraction
6. Prime Numbers and Factors
7. Fractions-Multiplication and Division
8. Angles-Measures and Measurements
9. Multiplication and Division of Fractions Review
10. Metric Geometry
11. Computing with Fractions
12. Numbers, Patterns and Theory
13. Decimals-Meaning and Operations
14. Probability I
15. Decimals Review
16. Counting in Base 5
17. Flow Charts I
18. Whole Numbers-Skills and Meanings
19. Measurement and Measures-Linear

20. Flow Charts and Tables
21. Fraction Operations
22. Introduction to Integers
23. Integers-Addition and Subtraction
24. Number Sentences and Order
25. Measurement and Measures-Area and Volume Measure
26. Number Sentences-Equations and Inequalities
27. Percent
28. Polygons, Angles, Measures and Lengths of Sides
29. Using Formulas
30. Decimals and Percent-Meanings and Applications
31. Geometric Activities
32. Probability II
33. Sketches and Constructions
34. Decimals and Percent
35. Mathematics Applications
36. Combinations and Permutations
37. Whole Numbers-Systems and Bases
38. Probability
39. Similarity
40. Integers-Meaning and Operations
41. Integer Review
42. Number Sentences-Relations and Properties
43. Number Theory
44. Square Roots, Squares and Right Angles
45. Measurement
46. Fraction Forms
47. Experiments in Geometry
48. Ratios and Right Triangles
49. Points, Lines and Planes
50. Probability III
51. Variables
52. Equations and Inequalities
53. Graphs on a Line
54. Graphs on a Plane
55. Algebra I – Whole Numbers
56. Algebra I – Multiplication and Division
57. Algebra I – Operations of Numbers
58. Algebra I – Decimals and Percent
59. Algebra I – Measures and Ratio
60. Algebra I – Ordinary Arithmetic
62. Algebra I – Rational Numbers
62. Algebra I – Polynominals
63. Algebra I – Functions and Basic Geometry
64. Algebra I – Linear Equations and Systems of Equations
65. Algebra I – Polynominals in Several Variables and Fractional Equations
66. Algebra I – Roots, Radicals and Quadratic Equations

Within these units, the student works in a precisely managed system of instruction as indicated in the flow chart below. This charts the series of instructional decisions to be made for each unit in the learning materials. The route that a particular student takes for a given unit depends on both his or her performance on the unit pre-test and the teacher's diagnosis of the student's needs for the unit.

Placement into the instructional management system is based upon the results of an initial diagnostic test to determine if Unit 1 is suitable for the student. If not, the teacher assigns work from optional materials to prepare the student for future entry. If Unit 1 is suitable, the student takes the Unit 1 pre-test and the following steps are then followed:

1. If the student demonstrates mastery of the objectives in Unit 1 he then moves on to the Unit 2 pre-test and so on. If the Unit 1 objectives are not mastered, those unlearned objectives are recorded by the teacher on the student's record card and the student is assigned those pages in the learning material where the objectives are taught.
2. The student completes the assigned work with individual help from the teacher when needed and then takes the post test. If objective mastery is demonstrated, the student moves on to the next unit. If not, his needs are noted on the record card and additional materials are pre-



FLOW CHART OF INSTRUCTIONAL MANAGEMENT SYSTEM

scribed. When he is ready, the post test is re-administered. Individual situations may arise when the teacher must circumvent the system because of a student's specific needs in order to prevent frustration or to work around an insignificant obstacle to significant progress. For example, in the case of a frustrated student who has problems in understanding long division, it may be well to move on to the next unit and return later to master long division.

B. *Language Arts:* The language arts instructional system comprises (1) a reading system; (2) a composition system; and (3) a grammar and spelling-vocabulary system.

1. The reading system is composed of (a) self paced. individualized reading skills; (b) large group literature instruction: (c) small group literature instruction; and (d) peer group instruction.

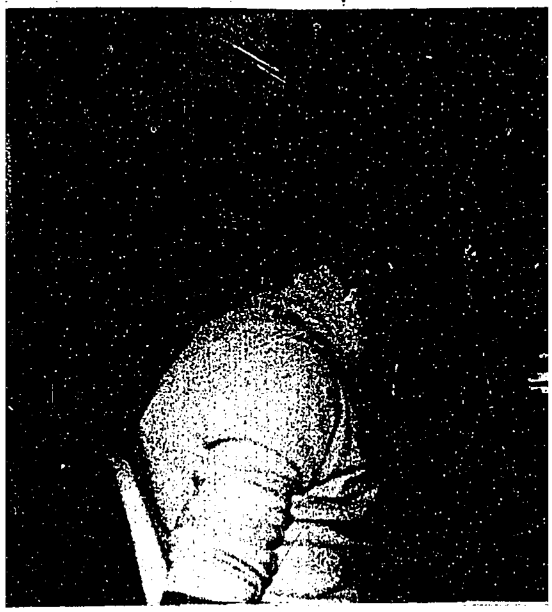
(a) Self-paced, individualized reading skills are taught on nine levels – from fourth through twelfth grades – organized to meet the needs of heterogeneously grouped students with a wide variety of reading levels. Each student is placed at an appropriate level through the use of standardized test scores, cloze test results, past performance records, and the subjective judgement of the teacher. The student's progress is carefully monitored by the teacher using a record keeping system (described below); frequent student/teacher interaction occurs. Students work on skill packets in class and at home.

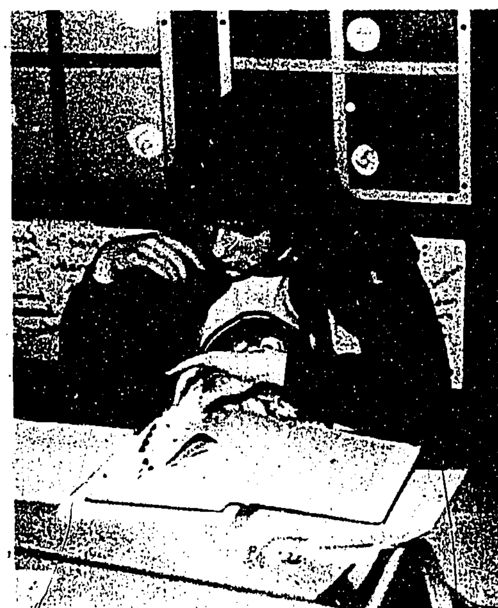
(b) Large group literature instruction is used to introduce the study of literature to a heterogeneous class, by focusing the entire class at the same time on one piece of literature. The teacher and volunteers read aloud while the class follows. Such instruction not only transcends multiple reading levels but also facilitates large group discussion, since the literary selections chosen from different reading levels have a central theme. This method of instruction seeks to: (1) improve the ability to conjure up descriptive passages, characters and action; (2) emphasize the dramatic quality of literature when read aloud; (3) introduce genre and the literary elements of theme, plot, character, symbolism, etc.: (4) bring together individuals with different backgrounds, experiences and opinions, to discuss conflicting attitudes, ideas and values; (5) offer another approach to the teaching of reading through listening and responding; (6) encourage the art of reading aloud.

(c) Small group literature instruction follows initial instruction in the large group. The class is divided into three or more different reading levels to read different novels or stories centered around one common theme. This theme may be the study of genre, character development, the author's use of humor, or a concept such as survival, or personal identification. In the small group, individual differences can be met more effectively. To avoid any stigma that may result from intra-class grouping, work is directed toward a total group objective. The student is aware of the understanding he must acquire to enable him to contribute meaningfully to the total group project. Instructional goals of the small group are: (1) to enhance skills introduced in the large group at reading levels commensurate with the student's ability; (2) to improve the student's reading, speaking and thinking skills.

(d) Peer group instruction occurs in the rearrangement of the small groups into heterogeneous units of 4 to 5 students who work together on a creative project which synthesizes the concepts and skills developed in the large and small instructional groups. A sample project would be the writing of an original story in which the characters of each selection read in the small groups meet at a summer camp. The objectives of peer group instruction are: (1) to bring themes, concepts and skills developed in large group and small group activities together into a single creative project; (2) to offer a project wherein students of varied abilities and backgrounds instruct one another, work together to solve problems and evaluate their work as a total unit. This last objective is significant for the heterogeneous classroom, since students, who would normally be separated, learn to work together despite their varied abilities.

2. *The composition system,* introduced in the 6th grade, begins with topic sentences and progresses through letter writing, fact and opinion, summarizing, etc. It reinforces these skills in the 7th grade and introduces further techniques





such as problem solving, debate, cause and effect, and satire. The 8th grade course reinforces the skills learned in the 6th and 7th grades and probes more deeply into each form of expository writing: logical expression, comparison and contrast, cause and effect, and research writing. This developmental skills approach builds one skill upon another, combining them with the creative writing program at a level called *creative composition*, a synthesis of expository and creative expression. Thus, the two components are:

(a) *Self paced, individualized expository writing:* The expository writing course, based on the satisfactory application of specific skills and concepts at each of 10 levels of development, is organized through a wall chart displaying objectives, directions and suggested composition topics. The student's progress is indicated on the chart by a name tag which the student moves through each level of accomplishment. Students submit one composition each week and must complete a minimum of three before they move to the next level. The teacher determines when each student has satisfactorily met the necessary objectives.

(b) *Creative writing course:* The creative writing course offers heterogeneously grouped students an organized program in the creative expression of observations and feelings. Through large and small group instruction it teaches techniques in creative writing such as use of universal symbols, personification, flashback, dialogue, etc. Students are encouraged to express themselves creatively without fear of criticism. One class period each week or every other week brings together students of all abilities and backgrounds to listen and respond to each other's writings.

3. *The grammar and vocabulary-spelling system* uses 127 grammar cards, each presenting a specific grammar and usage skill with pre- and post tests for each skill thus enabling students to proceed at their own pace. The grammar cards coordinate the grammar skills and the student's writing experiences in other portions of the language arts program. Grammar drill work is done largely with the student's own sentences and compositions. Spelling and vocabulary skills are taught on three to five levels per grade. The words for each list are teacher selected from the literature studied by the students and from several spelling and vocabulary texts. A minimum of three different levels are offered each week to meet the varied needs. The course is organized through learning centers, on overhead projectors, or on lists distributed by the teacher. The objectives of the course are to teach spelling and vocabulary skills, to improve dictionary skills, and to provide additional practice in the contextual use of new words.

III. MONITORING SYSTEM

A simple record keeping system has been developed that enables the teacher to know precisely at what level the student is working. From these records the teacher is able to record graphically class and individual student progress at any point in time. Records in both language arts and mathematics are kept on 8½ by 11 inch index cards and stored in a 3 hole looseleaf notebook for easy access. Each record card has space for 16 units of work and each student has his or her own record card. At the end of the school year the record card is passed on to the new teacher and instruction resumes where it left off the previous school year.

IV. STORAGE SYSTEM

A simple and relatively inexpensive storage system is used in both language arts and mathematics which affords easy access for the student and teacher to the learning materials and controlled access to the pre- and post tests. Test storage can be in file cabinets. Learning materials are kept in 9 x 10 inch slots which can be cheaply made using furring strips and hard board.

Storage Room

V. CLASSROOM ORGANIZATIONAL SYSTEM

AAP classroom have been organized to meet the specific demands of individualized instruction within a heterogeneous class. The teacher acts as a facilitator of instruction rather than as an authority figure and lecturer. Students work in large groups, small groups, and as individuals, depending on the lesson plan of the teacher. Peer group instruction is encouraged and students are taught to help one another in their learning experiences. Continuous work in learning packages can become very mechanical and boring and the teacher must practice a variety of teaching methods to humanize instruction as much as possible while at the same time coping with the multitude of ways in which children learn.

VI. USE OF PARAPROFESSIONALS

Districts adopting the methods, techniques and strategies of the AAP will, for at least the initial year, require teacher aides. The change in teaching methods and the amount of papers to be corrected and recorded will be an overwhelming task for the beginning teacher. The aide supplies the needed arms and legs to get the program under way. The aide corrects papers, helps with the recording system, guides the students (also new to the system) to the appropriate learning materials, occasionally assists the teacher in helping students who become bogged down in some learning problem, and assists in the general management of the classroom. As a smooth pattern of classroom activity is achieved, the need for the aide diminishes since many of her tasks can later be accomplished by the teacher or the students themselves. The aides used in the program had no special pre-training but learned the system on the job. Later, they were invaluable in the training of teachers new to the program.

ADMINISTRATOR

I. STAFF SELECTION

For a program of individualized, heterogeneous instruction, administrators must take care to select teachers who not only understand that the need for such instruction but are also committed to fulfilling that need to the best of their abilities. Teachers unwilling to relinquish their role as a central authority figure and lecturer should be avoided.

II. SUPERVISION AND STAFF SUPPORT

Administrators must have a thorough understanding of the essential classroom components and must give adequate supervision to ensure that these components are functioning properly. In the initial year, classroom teachers may well feel overworked and, at times, overwhelmed by their classroom duties. They will require the full support of their administrators to implement the program effectively.

III. EVALUATION

The Academic Advancement Program is used in the Morris School District as an alternative to homogeneous grouping. The evaluative objective is to demonstrate that individualized, heterogeneous instruction is as effective as group homogeneous instruction in the teaching of basic mathematic and language arts skills. The Iowa Test of Basic Skills, administered throughout the District in the fall of each school year, is the evaluation instrument. Evaluation by adopting districts will depend on the program's use: if used, as in the Morris School District, as an alternative to homogeneous grouping "no significant difference" should be the objective. If used within homogeneous groups, the goal should be "significant difference," otherwise, there would be no educational reason for adopting the program.

IV. EXPANSION AND REFINEMENT IN THE DISTRICT

Once the program has been implemented, administrators should begin the planning for expansion and refinement commensurate with findings from supervisory and evaluation activities.

EVALUATION DESIGN AND RESULTS

COGNITIVE

The Academic Advancement Program seeks to demonstrate that by using a systematic, individualized, self paced method of instruction students of varied abilities can be effectively taught basic skills in mathematics and language arts in a heterogeneous classroom and that the two ideals of American education – meeting a student's individual academic needs and achieving social integration – can be effectively served at the same time.

Evaluation was based on 200 AAP students in grades 6-8 and a comparable control group receiving instruction in homogeneous classrooms. The Iowa Test of Basic Skills (1971 edition), the evaluation instrument, is used in the district-wide testing program, administered at a prescribed time under standardized conditions. The objective was to show no significant difference in growth between experimental (AAP) and control groups. In other words, no learning detriment associated with the change in teaching format from homogeneous to heterogeneous grouping. Pre- and post test data were compared for experimental and control groups using the ITBS mathematics and reading comprehension scores. A comparison of mean scores for these groups

was desired and it became necessary to adjust pre- and post test group means in accordance with corresponding cognitive aptitude means in order to give a true picture of growth during the experimental period. In short, aptitude for growth must be considered when measuring growth. An analysis of covariance for the Iowa scores (adjusted with corresponding cognitive aptitude test means) showed that the project group met the objective of no significant difference in growth for all areas of comparison. It should be noted that mean growth was generally higher for the experimental group and was significantly higher in mathematics at the .05 level for one 8th grade experimental group and at the .01 level for another 8th grade experimental group. There was concern among parents of experimental group students who were performing on or above grade level at the beginning of the experimental period that growth would not be as great in the experimental group as in the control group. Because of this, an additional comparison of adjusted group means was made for the sub-group. Results showed that growth in sub-groups was consistent with growth found in the total group. Experimental group growth was generally greater than control group growth but not significantly greater. An additional observation, based on data analysis, indicates that growth differences tend to increase in favor of the experimental group for students who remain in the program for more than one year.

AFFECTIVE

Questionnaires were sent to parents of each child in the program to determine if they noticed any changes in their child's attitudes toward school. Eighty-six percent of the parents noted that their child enjoyed school more or much more than in past years; when they were asked to comment on the program, the following responses were received:

"He becomes excited and anxious if he thinks he might lose a day in school."

"He is much happier and is more relaxed."

"He was on medication for tension. This year no medication was given or needed."

"She seems more concerned about her school work."

"She is so much more confident about all things. She is becoming sure of herself and her ability socially and academically."

"Every evening at supper she talks about all her subjects and tells us what she is doing in school. She never did this before."

"More confidence and less frustration."

"Maybe there is a weak point in the program. Right now I'm too ecstatic to notice."

"Recently our family had the opportunity of moving to a different state. The AAP was a prime factor in our decision to remain in the area for another school year."

"A more mature outlook in general and an increase in understanding and self discipline."

DISSEMINATION SERVICES

The Academic Advancement Program provides orientation presentations, visitation opportunities, dissemination materials, and training services to interested educators. General information may be secured upon request. A four-day training program with follow-up consultation is available free of charge to school districts that sign a commitment to replicate the program's essential elements. Consumer districts are requested to register one administrator with the teachers selected for the training.

MATERIALS

The program's curriculum materials may be purchased at cost. These include a Replication Manual for the Classroom Teacher, an Administrator's Guide, a Training Manual, and a filmstrip-tape presentation. Order forms for the manuals and the Producer-Consumer Agreement required for training and consultation services may be obtained from the Project Director.

COSTS

The orientation, training and consultant services provided by the AAP staff to consumer districts are free of charge, funded by ESEA Title III-IV(C). Consumer districts are responsible for costs incurred by their staff for training and installation of the program. The initial acquisition of learning materials may cost as much as ten to fourteen dollars per student depending on the grade of entry. Learning materials costs drop after the first year to about five to seven dollars per student. Storage facilities, a very necessary part of the program, should cost no more than two hundred dollars per classroom and are an initial start-up investment. Aides are necessary for the teacher to get the program started. One aide serves two teachers and approximately two hundred students in a departmental situation; in a self-contained classroom, aide service can be part-time for the period(s) assigned to mathematics or language arts. If the program is expanded, the trained aides will be an invaluable asset in the training of new teachers. Also, their services can be expanded to more teachers.

Further information about the Academic Advancement Program, its dissemination services and materials available may be obtained from:

Joseph H. Dempsey
Academic Advancement Program
Morris School District
40 Mills Street
Morristown, New Jersey 07960
(201) 539-6100

MORRIS SCHOOL DISTRICT
40 Mills Street
Morristown, N.J. 07960

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Turn-Key Trainer:
George R. Bellias

Cover Design: Betty Ann Bryant
Student, Morristown High School

Logo Design: Peter Mason
Student, Morristown, High School